

What is claimed is:

1. A liquid cooling system, comprising:

a pump for supplying cooling liquid in a form of pulsation;

5 a heat receiving jacket being supplied with said cooling liquid, and for receiving heat generated from a heat generating body;

a heat radiation pipe for radiating heat which is supplied by the cooling liquid passing through said heat receiving jacket; and

10 a passage for circulating the cooling liquid passing through said heat radiation pipe into said pump, wherein said cooling liquid circulates within a closed flow passage, and further

15  $\Delta V_s$  is equal to or greater than  $\Delta V_p$ , assuming that inner volume change when said pump emits the pulsation therefrom is the  $\Delta V_p$ , that pressure caused accompanying with said volume change is  $P$ , and that volume change due to said pressure  $P$  in the flow passage of the cooling liquid  $\Delta V_p$  other than portion of said pump.

20 2. A liquid cooling system, as defined in the claim 1, further comprising an accumulator, in which the volume change of the cooling liquid owned by itself due to said pressure  $P$  is equal or greater than the  $\Delta V_p$ .

3. A liquid cooling system, as defined in the claim 1, wherein said cooling liquid is pressurized at pressure being equal to or higher than that of an atmosphere.

25 4. A liquid cooling system, as defined in the claim 2, wherein said accumulator comprises a supply opening for supplying said circulating cooling liquid therethrough and a discharge opening for discharging said cooling liquid therethrough, and maintains

gas and said cooling liquid therein.

5. A personal computer, comprising:

a semiconductor element;

a signal input portion;

5 a display device; and

a liquid cooling system, including:

a pump for supplying cooling liquid in a form of pulsation;

10 a heat receiving jacket being supplied with said cooling liquid, and for receiving heat generated within said semiconductor element;

a heat radiation pipe for radiating heat which is supplied by the cooling liquid passing through said heat receiving jacket; and

15 a passage for circulating the cooling liquid passing through said heat radiation pipe into said pump, wherein said cooling liquid circulates within a closed flow passage, and further

$\Delta V_s$  is equal to or greater than  $\Delta V_p$ , assuming that inner volume change when said pump emits the pulsation therefrom is the  $\Delta V_p$ , that pressure caused accompanying with said volume change is P, and that volume change due to said pressure P in the flow passage of the cooling liquid  $\Delta V_p$  other than portion of said pump.

25 6. A personal computer, as defined in the claim 5, wherein said liquid cooling system further comprises an accumulator, in which the volume change of the cooling liquid owned by itself due to said pressure P is equal or greater than the  $\Delta V_p$ .

7. A personal computer, as defined in the claim 5, wherein said cooling liquid is pressurized at pressure being equal to or

higher than that of an atmosphere.

8. A personal computer, comprising:

a main body including a semiconductor element and a signal input portion;

5 a display device having a display portion, being connected with said main body through a movable mechanism; and

a liquid cooling system, including:

a pump for supplying cooling liquid in a form of pulsation;

10 a heat receiving jacket being disposed within said main body and supplied with said cooling liquid, and for receiving heat generated within said semiconductor element;

15 a heat radiation pipe being disposed in a back surface of said display portion of said display device, and for radiating heat which is supplied by the cooling liquid passing through said heat receiving jacket; and

20 a passage for circulating the cooling liquid passing through said heat radiation pipe into said pump, wherein said cooling liquid circulates within a closed flow passage, and said display device comprises an accumulator comprises: a supply opening for supplying said circulating cooling liquid therethrough; and a discharge opening for discharging said cooling liquid therethrough, and maintains gas and said cooling liquid therein, wherein,

25 an amount of the cooling liquid maintained within said accumulator is changed responding to emission of the pulsation from said pump.

9. A personal computer, as defined in the claim 8, wherein  $\Delta V_s$  is equal to or greater than  $\Delta V_p$ , assuming that inner volume change when said pump emits the pulsation therefrom is the  $\Delta V_p$ , that pressure caused accompanying with said volume change is P,

and that volume change due to said pressure P in the flow passage of the cooling liquid  $\Delta V_p$  other than portion of said pump.

10. A personal computer, comprising:

a semiconductor element;

5 a signal input portion;

a display device; and

a liquid cooling system, including:

an emission pump for supplying cooling liquid in a form of pulsation by using reciprocating movement of a diaphragm having  
10 a piezo element;

a heat receiving jacket being supplied with said cooling liquid, and for receiving heat generated within said semiconductor element;

15 a heat radiation pipe for radiating heat which is supplied by the cooling liquid passing through said heat receiving jacket;

an accumulator comprising, a supply opening for supplying said circulating cooling liquid therethrough and a discharge opening for discharging said cooling liquid therethrough, and for maintaining gas and said cooling liquid therein; and

20 a passage for circulating the cooling liquid passing through said heat radiation pipe into said pump, wherein said cooling liquid circulates within a closed flow passage, and said display device comprises wherein, said cooling liquid circulates within a closed flow passage, and,

25 an amount of the cooling liquid maintained within said accumulator is changed responding to emission of the pulsation from said pump.